

PORTAL ASSESSMENT DESIGN
SYSTEM FOR EDUCATIONAL TESTING

Linda S. STEINBERG et al.

Docket No. 246400.0159

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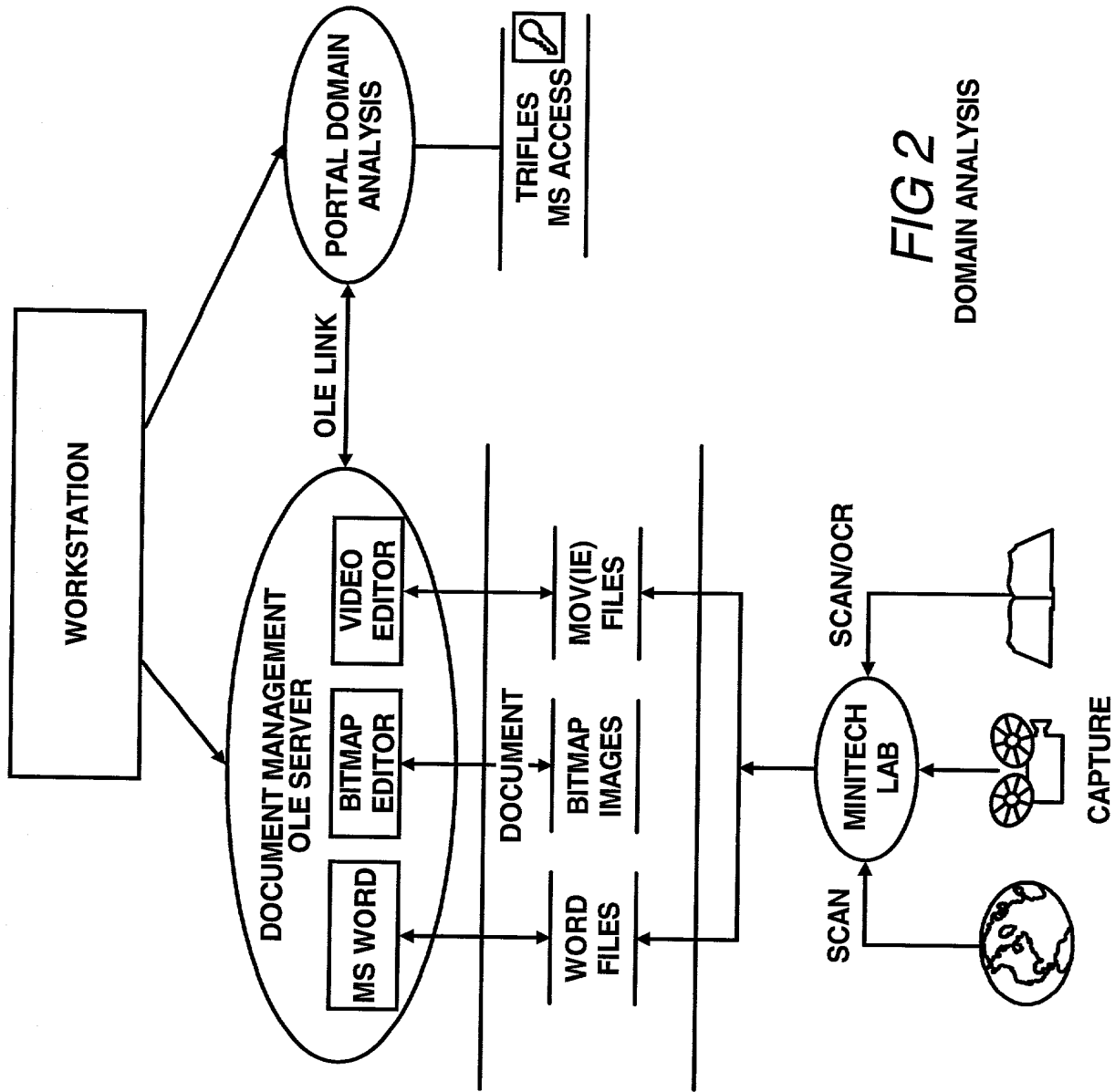
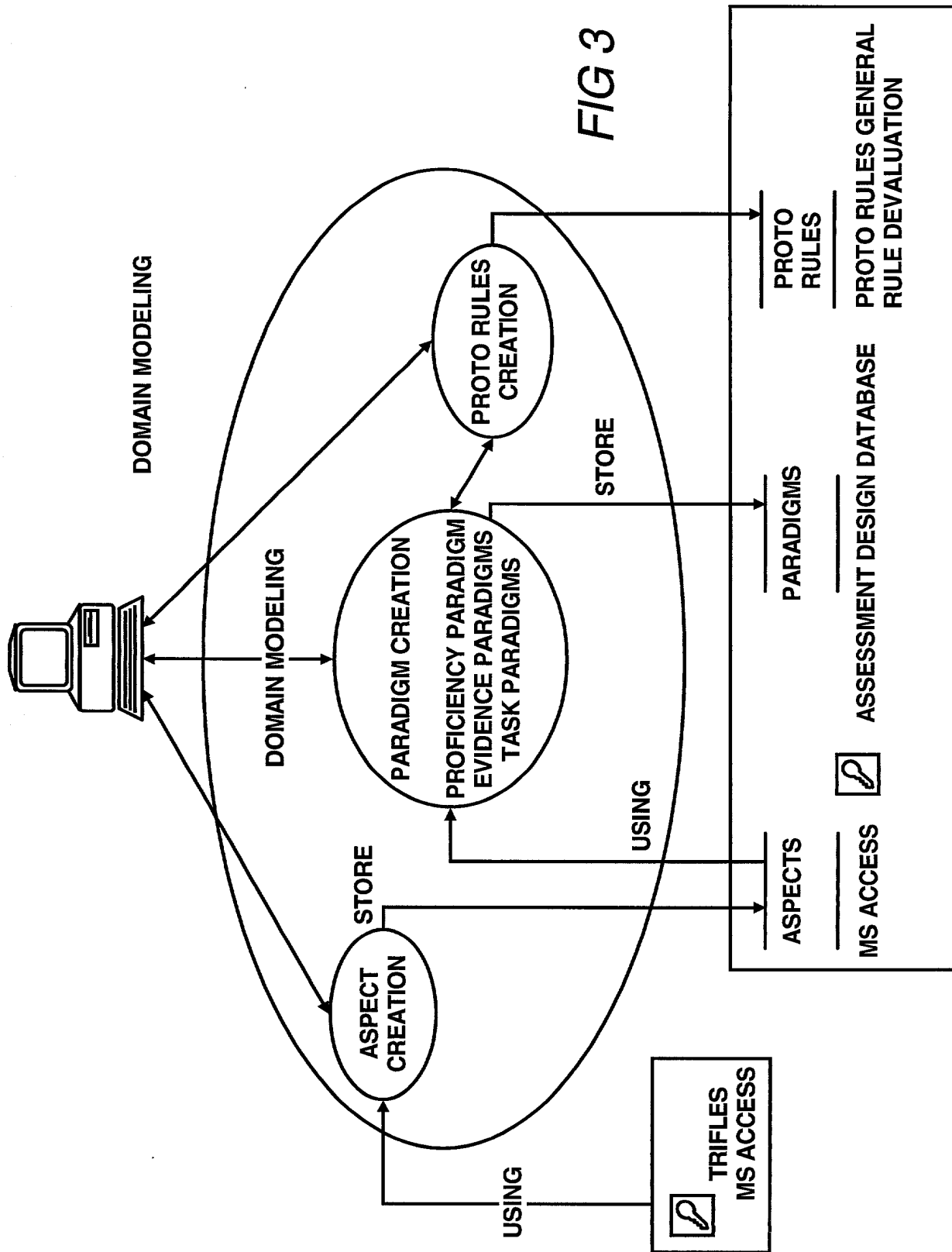
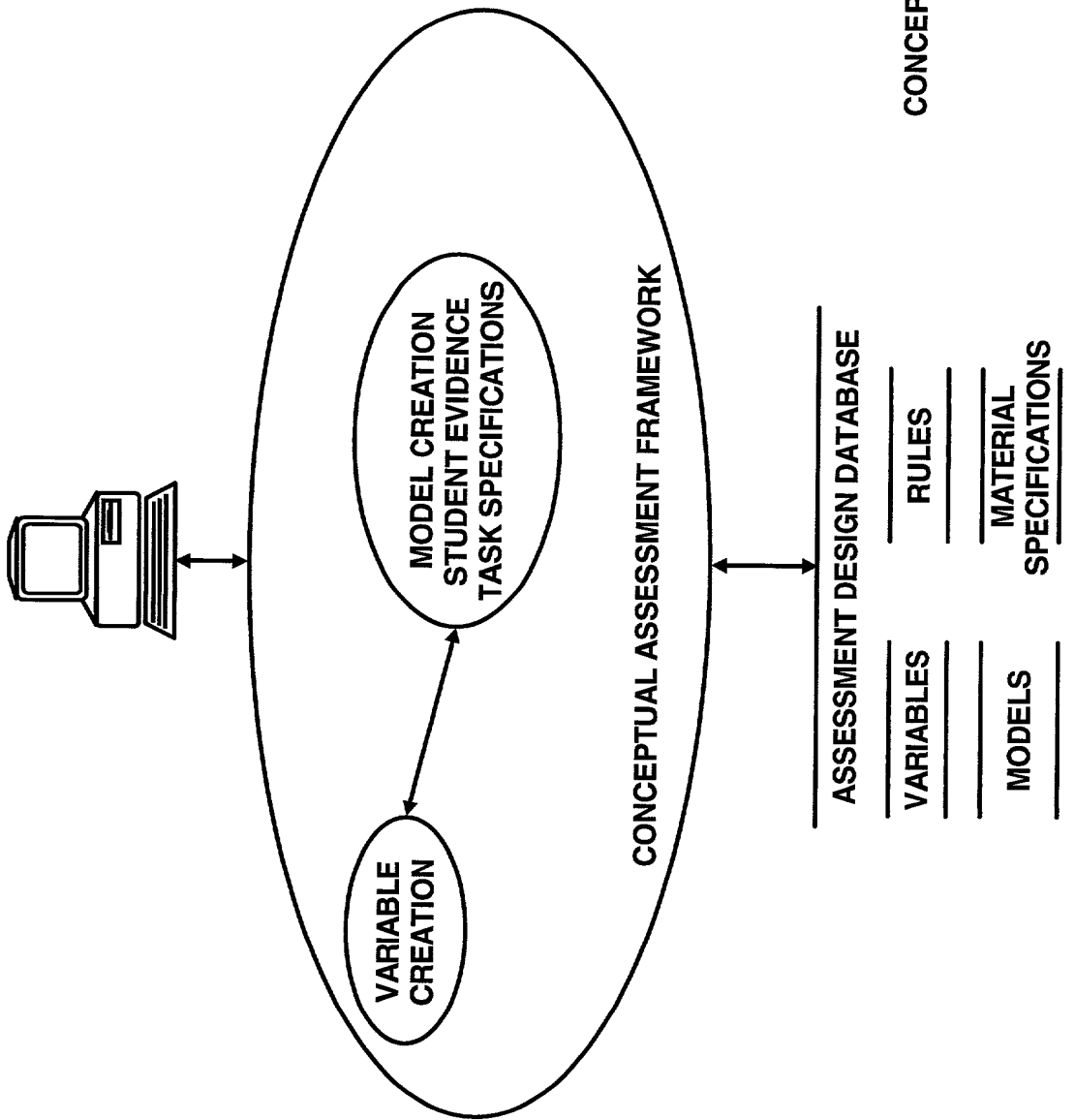
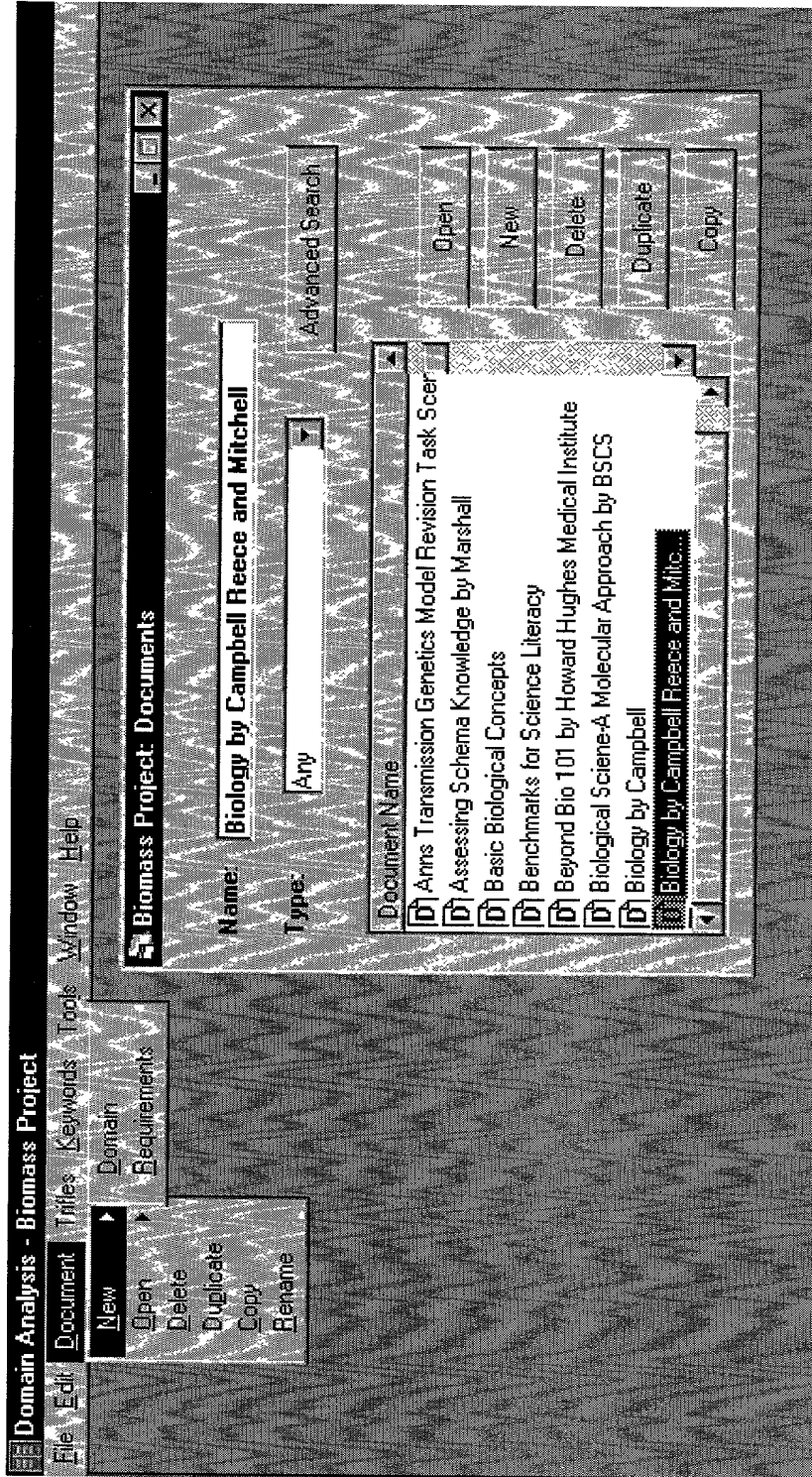


FIG 2
DOMAIN ANALYSIS

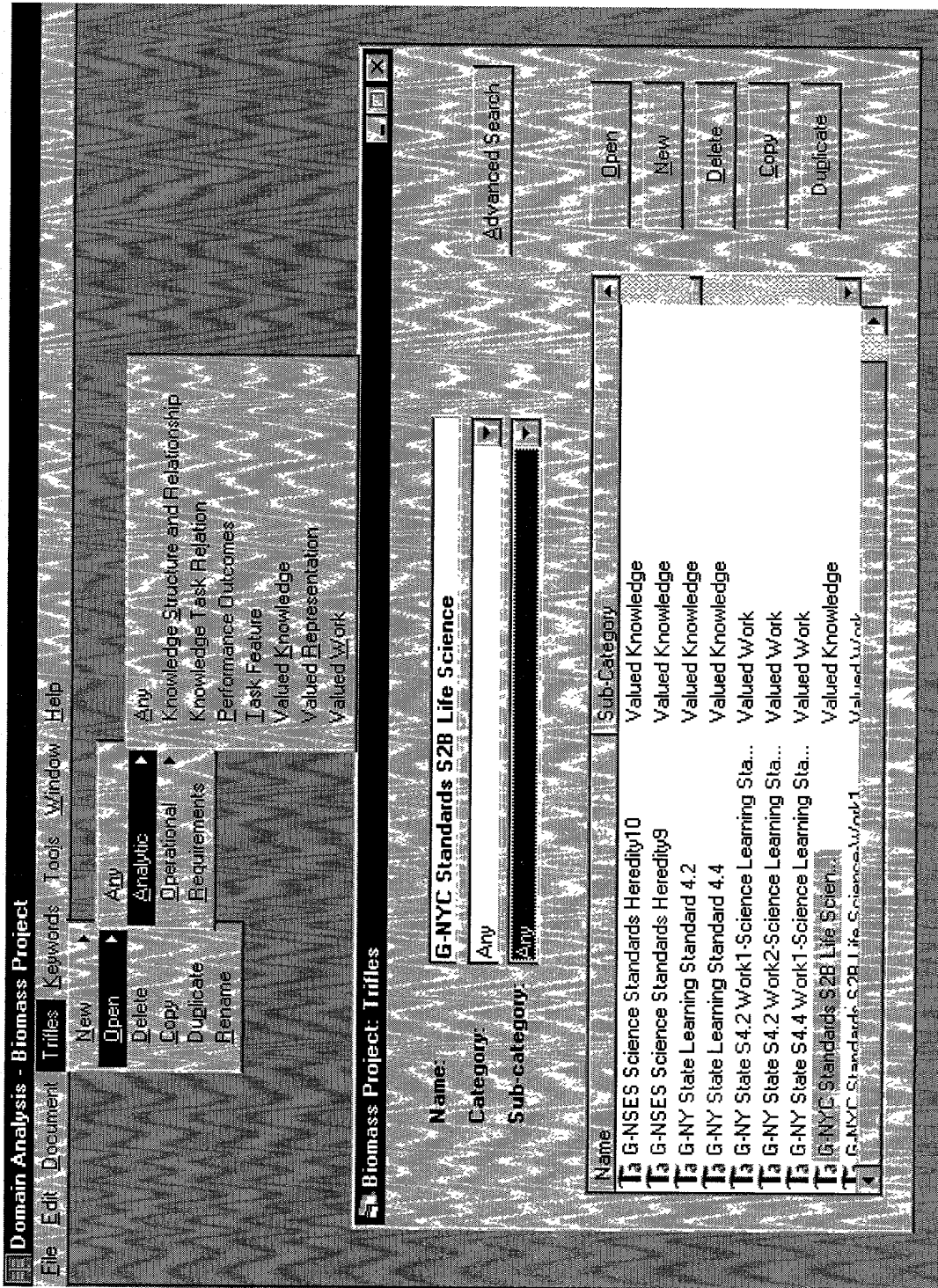






DOCUMENT MANAGEMENT FORM

FIG 5



TRIFLE MANAGEMENT FORM

FIG 6

New Presentation Paradigm

Name:
Presentation Paradigm 2

Description:

Tasks Properties Pedigree Hierarchies Notes

Add Remove Open

Presentation Note:

OK Save Cancel Help

PRESENTATION PARADIGM

FIG 7

Domain Modeling - Biomass Project

File Edit View Aspects Paradigms Proto Rules Keywords Tools Window Help

Proto Rules

Name:

AP/Claim Add Remove Open

DPS Add Remove Open

Relationship Choose

Difficulty

Context effect

KR Add Remove Open

DPO Add Remove Open

Related Proto Rules

☐ Pasing ☐ Evaluation ☐ Interpretation

Add Remove Open

OK Apply Cancel

PROTO RULES

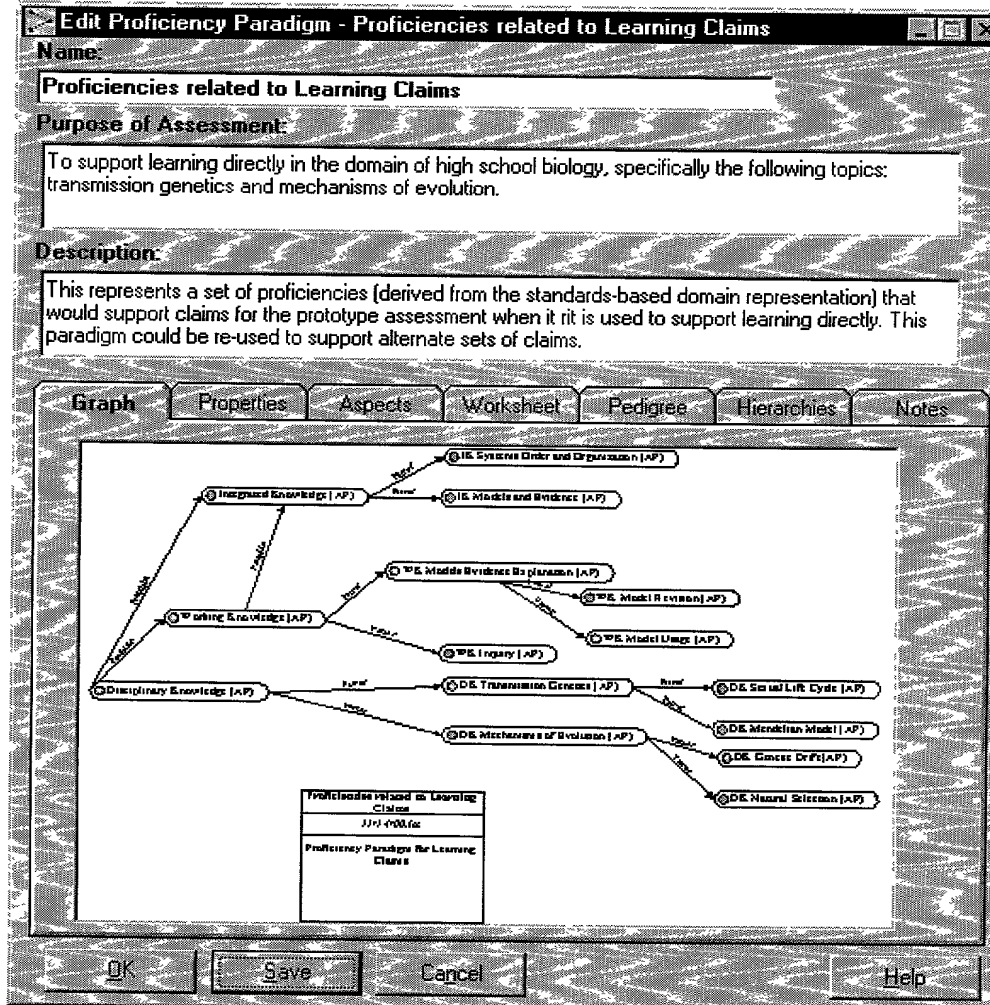
FIG 8

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PROFICIENCY PARADIGM

FIG 9A

Edit Proficiency Paradigm

Name: Proficiencies related to Learning Claims

Purpose of Assessment: To support learning directly in the domain of high school biology, specifically the following topics: transmission genetics and mechanisms of evolution.

Description: This represents a set of proficiencies (derived from the standards-based domain representation) that would support claims for the prototype assessment when it is used to support learning directly. This paradigm could be re-used to support alternate sets of claims.

Graph Properties Aspects **Scope** Pedigree Hierarchies Notes

Evidence Paradigms

- Agouti Segment 1 - Formalize Ho (Evid...
- Agouti Segment 10 - Cross Expertise (E...
- Agouti Segment 11 - Punnett Sq (Evid...
- Agouti Segment 12 - Chi Sq (Evidence)
- Agouti Segment 13 - Ho Confirm/Disco
- Agouti Segment 14 - Ho Confirm/Disco
- Agouti Segment 15 - Ho Confirm/Disco
- Agouti Segment 16 - Write Report (Evi...
- Agouti Segment 17 - Sexual Life Cycle
- Agouti Segment 2 - Verify Method (Evi...
- Agouti Segment 3 - Phenotypic Proport
- Agouti Segment 4 - Impasse (Evidence...

Worksheets

Add Remove Open

OK Save Cancel Help

PROFICIENCY PARADIGM

FIG 9B

Edit Aspect Of Proficiency

Name: DK Mendelian Model (AP)

Description:
This potential student model variable represents factual (declarative and procedural) knowledge of the Mendelian Model (absent its integration w/inquiry or unifying concepts).
Used in Reporting in assessment to support learning.

Properties **Pedigree** **Hierarchies** **Notes**

I Belong To:
☒ DK Transmission Genetics (AP)

Belongs To Me:

Add... Remove Open... Add... Remove Open...

OK Save Cancel Help

AN EXAMPLE OF AN ASPECT OF PROFICIENCY

FIG 9C

Edit Descriptor Of Performance Outcomes And Behavior

Name: Data Organization - Scoring Obs

Description: This describes possible outcomes for organizing data so that it can be interpreted.

Possible Values:
Add
Effective data organization
Somewhat effective data organization
Ineffective data organization

Keywords:
Add Remove

Roles:
☒ Observable
☐ Consolidation

Buttons: OK Save Cancel Help

Edit Descriptor Of Performance Outcomes And Behavior

Name: Data/Model Relationships - Scoring Obs

Description: This describes possible outcomes in relating patterns of data to particular models

Possible Values:
Add
Data and model(s) related appropriately
Data and model(s) related somewhat appropriately
Data and model(s) not related

Keywords:
Add Remove

Roles:
☒ Observable
☐ Consolidation

Buttons: OK Save Cancel Help

EXAMPLES OF DESCRIPTORS OF PERFORMANCE OUTCOMES / BEHAVIORS

FIG 10

The screenshot shows a software window titled "Edit Proto Rule". At the top, the "Name:" field contains "Agouti Segment 1 Interpretation Rule". The window is divided into several sections:

- AP/Claim:** Contains a radio button labeled "DK Mendelian Model (AP)". Below it are "Add", "Remove", and "Open" buttons.
- Relationship:** A text box containing the text: "Parents DKM and CONTEXT are modeled as compensatory over each of the 4 instances of MMRRep and 3 instances of MMGen."
- Difficulty:** A text box containing the text: "All observables are expected to be of typical difficulty, except the first Mendelian Model Representation one--it is expected to be easier than typical." Below this text are three radio buttons: "Parsing", "Evaluation", and "Interpretation".
- DPS:** An empty text box with "Add", "Remove", and "Open" buttons below it.
- DPO:** A list box containing two items: "Mendelian Model Gener..." and "Mendelian Model Repre...". Below it are "Add", "Remove", and "Open" buttons.
- Related Proto Rules:** A section with three checkboxes: "Parsing", "Evaluation", and "Interpretation". To the right of these checkboxes is an empty text box. Below this section are "Add", "Remove", and "Open" buttons.

At the bottom right of the window are three buttons: "OK", "Apply", and "Cancel".

AN EXAMPLE INTERPRETATION PROTO RULE

FIG 11

Select A Role

☒ Difficulty
☒ Evidentiary Focus
☒ Task Selection
☐ Interpreting Proficiency
☐ Realism
☐ Response Target
☐ Dynamic Simulator Setting

OK Cancel

Name: Agouti Segment 1 - Formalize Ho (Task)

Description:
This paradigm describes task segment 1 of the agouti mouse scenario. This segment is focused on knowledge related to the Mendelian Model and its representation, as well as investigative technique.

Stimulus **Response** **Scope** **Properties** **Pedigree** **Hierarchies** **Notes**

Stimulus Notes
and Investigative knowledge probes which are presented as means for interpreting these data.
Population Summary Cross Table is both stimulus and response.
MNI Standard Test Form and MNI

KR
Add Remove Open
MNI Standard Test Form
MNI Symbol Tool Box
Population Attribute Table
Population Summary Cr...
Text Prompt(s)

DPS
Add Remove Open View As: Tree List
Show Category: All
Knowledge Level
Number of Genes Determining Characteristic of Interest
Organism
Prototype Domain
Transmission Genetics
Transmission Genetics Models
Roles of Selected DPS: DES Edit Roles

OK Save Cancel Help

EXAMPLE ROLES OF DESCRIPTORS OF PERFORMANCE SITUATIONS IN A TASK PARADIGM

FIG 12

Edit Task Skeleton

Name: **Agouti Segment 1 - Formalize Ho (Task)TS1**

Paradigm Name: **Agouti Segment 1 - Formalize Ho (Task)**

Description:
This paradigm describes task segment 1 of the agouti mouse scenario. This segment is focused on knowledge related to the Mendelian Model and its representation, as well as investigative technique.

Stimulus **Response** **Scope** **Properties** **Pedigree** **Notes**

KR

Add... Remove Open

MDI Standard Text Form
MDI Symbol Tool Box
Population Attribute Table
Population Summary Cr...
Text Prompt(s)

Stimulus Notes

The primary stimulus material for this task is the Population Summary Cross Table. In this version it contains Jose's original crosses and results.

Prompts are used for Disciplinary and Investigative Knowledge.

DPS

Show Category: All

Open... View As: ☒ Tree ☐ List

Domain Topic Requirement * Transmission genetics
Knowledge Level * Working
Number of Genes Determining Characteristic of Interest * one
Organism * real mammal
Prototype Domain * biology
Transmission Genetics * mode of inheritance

Roles of Selected DPS:

OK Save Cancel Help

FIG 13

New Student Model Variable

Variable Name: **Student Model Variable 70**

Description:

States | **Properties** | **Pedigree** | **Notes**

State Details

State Name:

State Description:

☐ True State

☐ Ordered States

↑ ↓

Add Remove Sort

OK Save Cancel Help

STUDENT MODEL VARIABLE

FIG 14

New Evidence Model Variable

Variable Name: **Evidence Model Variable 185**

Description:

States | Properties | Pedigree | Notes

State Details

State Name:

State Description:

☐ True State

☐ Ordered States

Buttons: Add, Remove, Sort, Up Arrow, Down Arrow, OK, Save, Cancel, Help

EVIDENCE MODEL VARIABLE

FIG 15

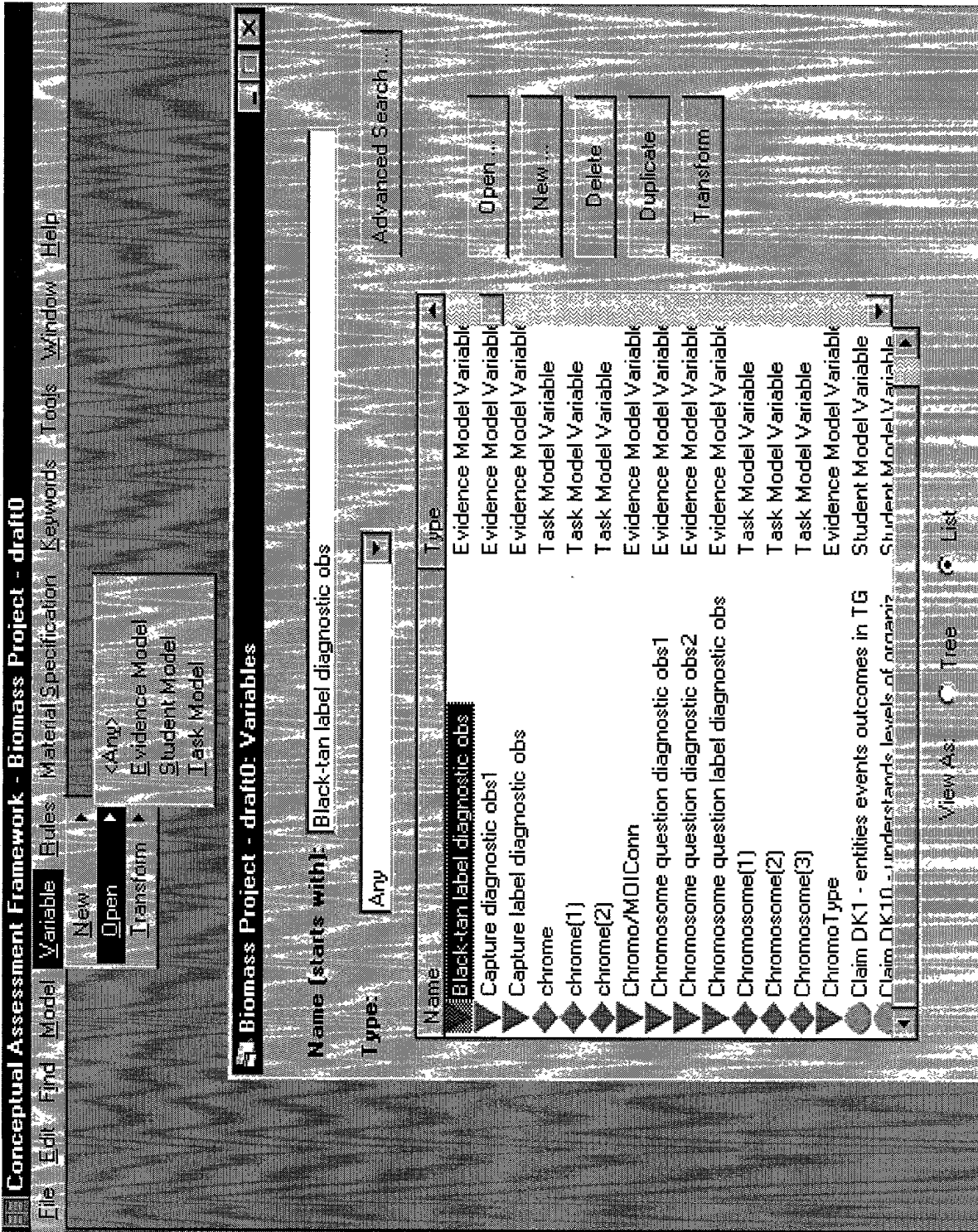


FIG 16

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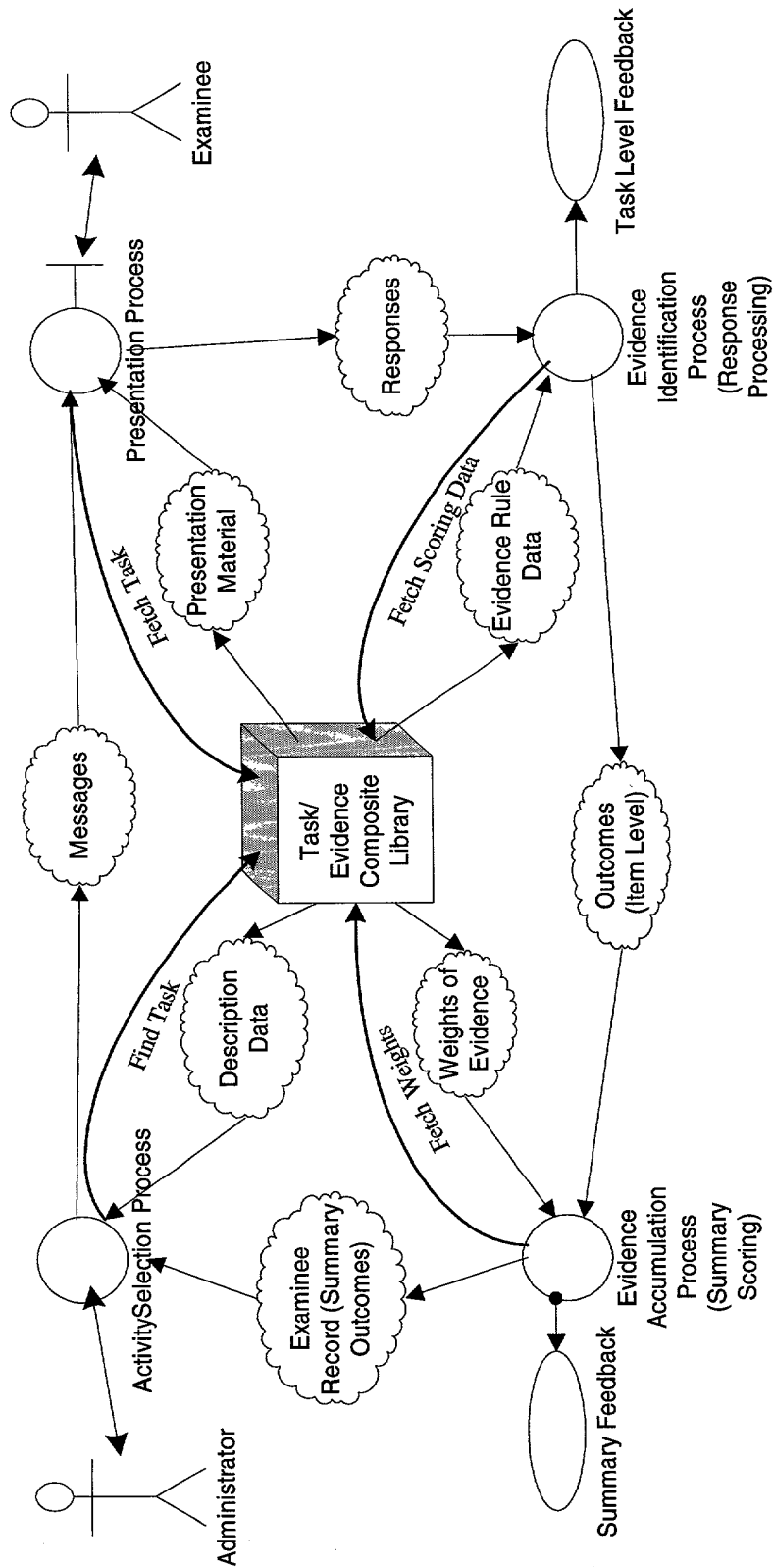
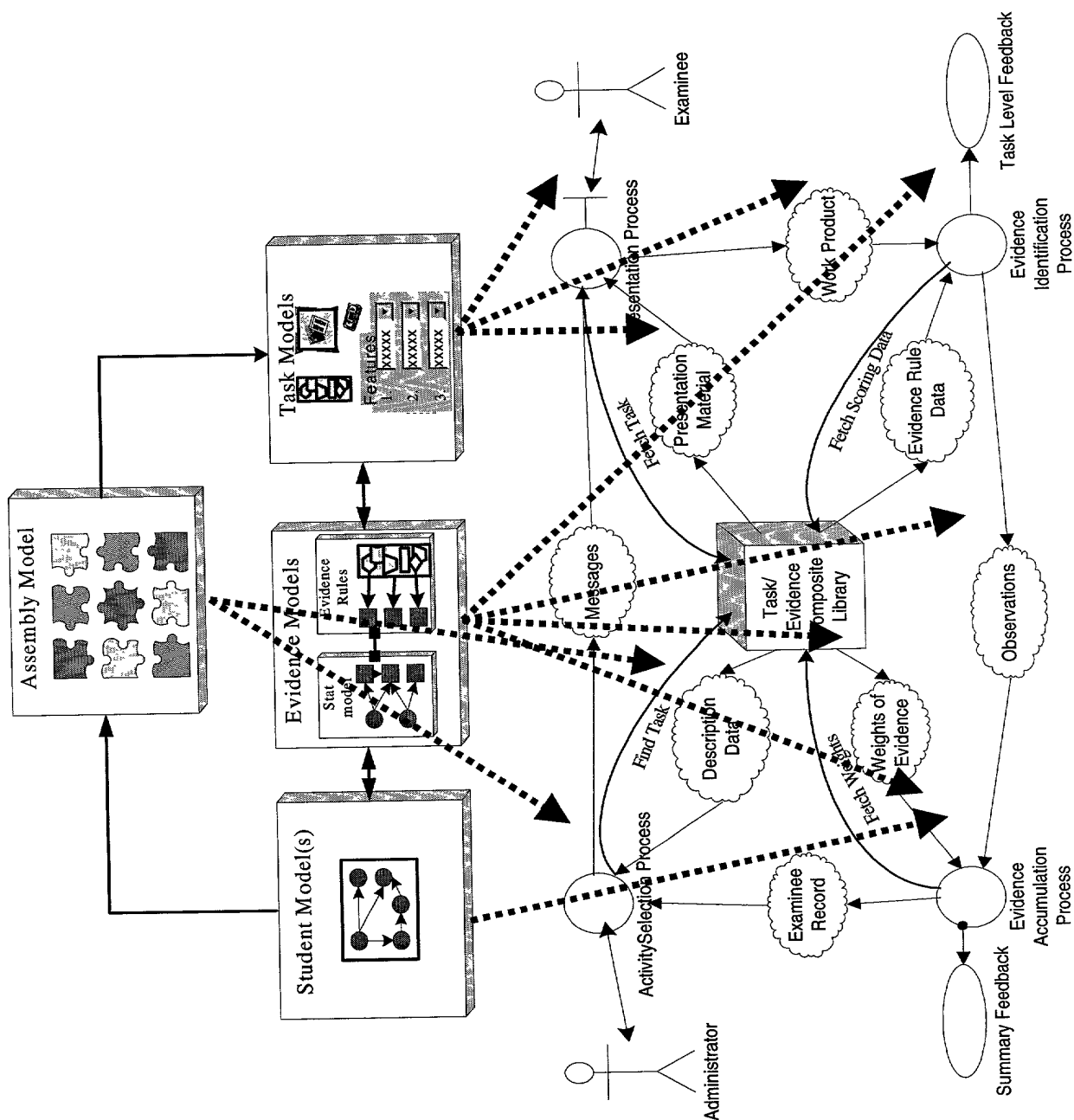


FIG 17

FIG 18



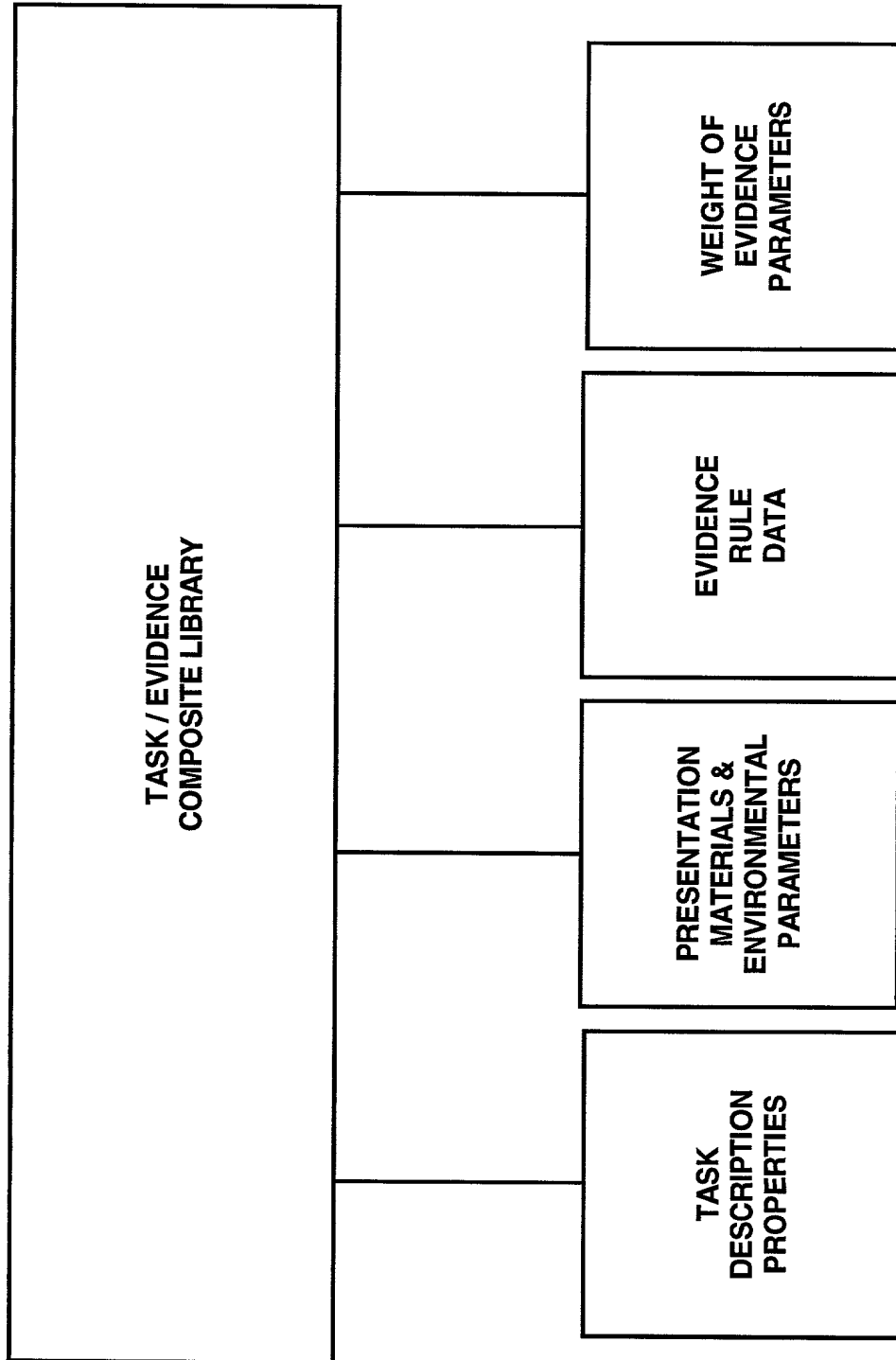


FIG 19

Edit Student Model Variable

Variable Name: wKInquiry

Description:
 This potential student model variable represents the use of efficacious scientific methodology in formulating inquiries into transmission genetics and mechanisms of evolution.

States **Properties** **Pedigree** **Notes**

State Details
 State Name:
 State Description:

☐ Time State

☐ Ordered States

Edit Student Model Variable

Variable Name: DKMendel

Description:
 This potential student model variable represents factual (declarative) knowledge of the Mendelian Model (absent its integration w/inquiry or unifying concepts).
 Reporting: Interim + task-based feedback.

States **Properties** **Pedigree** **Notes**

State Details
 State Name:
 State Description:

☐ Time State

☐ Ordered States

EXAMPLE STUDENT MODEL VARIABLES WITH STATES

FIG 20

Reporting Rule

Rule Name: **Reporting for WK and Transmission Genetics**

Rule Type: **<unspecified>**

Description:

Specification | Pedigree | Notes

Instructions (human or computer):

Claims: ★ WK Claim 9

Input Variables:

- ☐ DK
- ☐ DKMendel
- ☐ DKTmGen
- ☐ WKInqy
- ☐ WKModRev
- ☐ WKModUse

Output:

Reporting Name: **Sample Statistic**

Interpretation:

Score Ranges:
Probabilities at particular levels of proficiency, accompanied by **Score Interpretation Guide**.

Diagrams:

OK Save Cancel Help

AN EXAMPLE REPORTING RULE

FIG 21

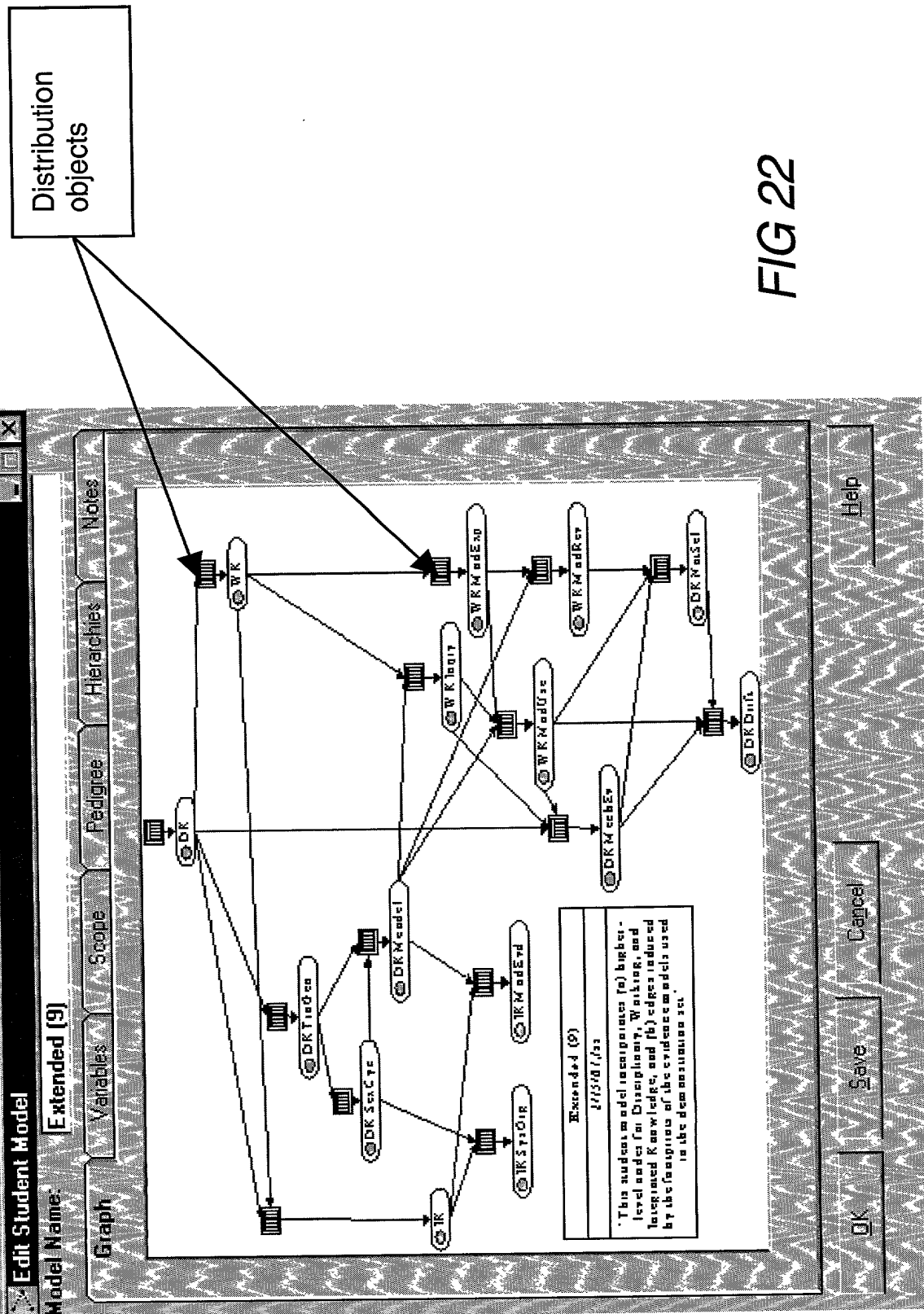


FIG 22

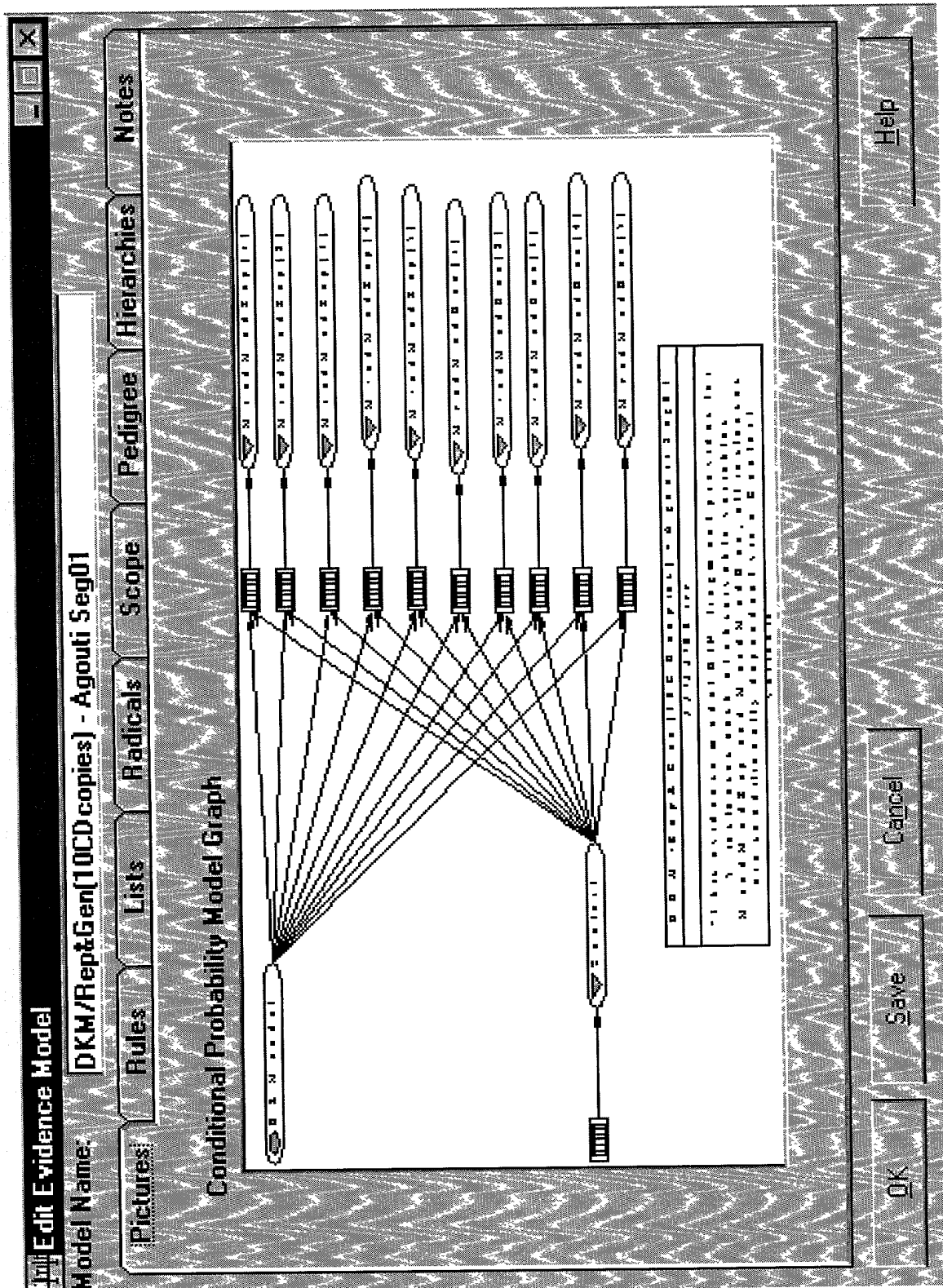


FIG 23